



MISSOURI DEPARTMENT OF TRANSPORTATION
INFORMAL QUOTE GUIDELINES AND DOCUMENTATION

REQUEST FOR QUOTATION

It is the vendor's responsibility to read and comply with all conditions, specifications, and instructions outlined in this document. This document and any subsequent attachments shall supersede all confirmation forms, receipts, or any other paperwork needed to secure materials, equipment, or services.

TODAY'S DATE: NOVEMBER 23, 2008	QUOTE DUE BY (DATE AND TIME): NOVEMBER 26, 2008 @ 1:00 PM CENTRAL TIME	F.O.B. REQUIREMENTS: DESTINATION (SEE DELIVERY LOCATION BELOW)
TO BE DELIVERED BY: DECEMBER 8, 2008	QUOTATION # D209-038-R2 THIS QUOTATION # SHOULD BE REFERENCED ON ALL MAILING LABELS, ENVELOPES, AND ANY OTHER CORRESPONDENCE.	BUYER NAME: WILLIAM D. "BILL" NOYES, CPPO, CPPB INTERMEDIATE PROCUREMENT AGENT PHONE NUMBER: (660)-385-8245 FAX: (660)-385-1707
Mailing Address: (RFQ responses may be faxed) Missouri Department of Transportation – District 2 General Services (Procurement) Division 902 North Missouri Street P.O. Box 8 Macon, MO. 63552		Delivery Location: MoDOT – District 2 – Fayette Maintenance Building 871 State Hwy 240 Fayette, MO. 65248 Rt. 240 – 1 mile South of Rt. W (Howard County)

We request delivery by December 8, 2008. Specify if you can meet this delivery deadline.
If you cannot, specify the earliest delivery date you can meet, in the spaces provided below.
ALL BIDS MUST BE EXTENDED AND TOTALED. **DELIVERY TIME MUST BE LISTED.**

NOTE: TO ACCOMMODATE DISTRICT INVENTORY CONTROL PROCESSES, THE COST OF THE BANDS REQUESTED WITH THE PIPE BELOW MUST BE INCLUDED IN THE UNIT PRICE OF THE PIPE.

Qty	U/ M	DESCRIPTION	UNIT PRICE	UNIT PRICE EXTENSION	DELIVERY TIME
40	FT	18" x 20' Corrugated Metal Pipe with 2 bands (minimum 24" wide – including hardware)			
20	FT	42" x 20' Corrugated Metal Pipe with 1 band (minimum 24" wide – including hardware)			
30	FT	42" x <u>30'</u> Corrugated Metal Pipe with no bands (0)			
40	FT	48" x 20' Corrugated Metal Pipe with 2 bands (minimum 24" wide – including hardware)			
10	FT	48" x <u>10'</u> Corrugated Metal Pipe with no bands (0)			
TOTAL ORDER EXTENSION				\$	

REQUIRED SPECIFICATIONS

All materials must comply with MoDOT Specification # MGS-91-11G (dated 10-18-04) and other provisions outlined in the solicitation documents. The material to be supplied will meet the requirements of the **Missouri Standard Specifications for Highway Construction, Edition of 2004**, and any revisions thereto, unless modified by these specifications.

DELIVERY – ADDITIONAL REQUIREMENTS

The Contractor shall furnish the Missouri Department of Transportation with a planned delivery schedule at least 24 hours before starting delivery. Notification should be during the normal workday preceding the day on which the Contractor desires to initiate delivery. A representative of MoDOT is to be present when the material is delivered.

F.O.B.

Materials quoted are F.O.B. Destination. Delivery costs must be included in the unit price, not listed as a separate line item.

VENDOR NAME: (Please enter your company name in this block)

PREFERENCE IN PURCHASING PRODUCTS

DATE: _____

The bidders attention is directed to Section 34.076 RsMO 1986 which gives preference to Missouri corporations, firms, and individuals when letting contracts or purchasing products.

Bids/Quotations received will be evaluated on the basis of this legislation.

All vendors submitting a bid/quotation must furnish ALL information requested below.

FOR CORPORATIONS:

State in which incorporated: _____

FOR OTHERS:

State of domicile: _____

FOR ALL VENDORS:

List address of Missouri offices or places of business:

THIS SECTION MUST BE COMPLETED AND SIGNED:

FIRM NAME: _____

ADDRESS: _____

CITY: _____ **STATE:** _____ **ZIP:** _____

BY (signature required): _____

Federal Tax I.D. #: _____ **if no Federal Tax I.D. # - list Social Security #:** _____

NOTE: For bid/quotation to be considered, the "Preference in Purchasing Products" form must be on file in the General Services (Procurement) Division and must be dated in the current calendar year.

CERTIFICATE OF GOOD STANDING

The Bidder must be in compliance with the laws regarding conducting business in the State of Missouri. Within ten (10) business days of notification, the Bidder will need to provide a copy of his/her Missouri Secretary of State's "Certificate of Good Standing" prior to the issuance of any contract or initial purchase order by the Missouri Department of Transportation (MoDOT). MoDOT reserves the right, at its sole discretion, to extend the date this documentation must be provided. The Bidder's inability to provide this documentation will result in his/her bid being rejected.

RsMO 34.040.6 COMPLIANCE

The Bidder must be in compliance with the laws regarding conducting business in the State of Missouri. The Bidder should ensure they are in good standing with the Missouri Department of Revenue. Prior to award MoDOT staff will check with the Missouri Department of Revenue to ensure compliance with the provisions of RsMO 34.040.6. If necessary a "Certificate of No Tax Due" may be requested of the successful Bidder. If such a certificate is requested, the Bidder's inability to provide this documentation will result in his/her bid being rejected.

AWARD

Award of this quote will be made on an "All Or Nothing" basis using the "lowest and best" principle of award.

VENDOR NOTES

VENDORS MAY ALSO ATTACH OTHER PERTINENT OR SUPPORTING DATA WITH THEIR RESPONSE TO THIS RFQ.

Missouri Department of Transportation purchase orders must be issued to the invoicing company/address. If the invoicing company/address will be different from that listed in the vendor information section (below), the vendor should specify the "remit to" company/address in the vendor notes section (above).

VENDOR INFORMATION

Vendor Name/Mailing Address:	Vendor Contact Information (including area codes):		
	Phone #:		
	Cellular #:		
Email Address:	Fax #:		
Printed Name and Title of Responsible Officer or Employee:	Signature:		
Is your company registered/certified with the State of Missouri as a (please circle):			
MINORITY BUSINESS ENTERPRISE (MBE) ?		YES	NO
WOMEN BUSINESS ENTERPRISE (WBE) ?		YES	NO
Would your company like information on becoming a registered/certified MBE/WBE vendor?		YES	NO
Is your company a MISSOURI SERVICE-DISABLED VETERAN BUSINESS?		YES	NO
A service-disabled veteran is defined as any individual who is disabled as certified by the appropriate federal agency responsible for the administration of veteran's affairs. A service-disabled veteran business is defined as a business concern: <ul style="list-style-type: none"> not less than fifty-one (51) percent of which is owned by one or more service-disabled veterans or, in the case of publicly owned businesses, not less than fifty-one (51) percent of the stock of which is owned by one or more service-disabled veterans; and the management and daily business operations of which are controlled by one or more service-disabled veterans. 			

All responses to this Request For Quotation should be submitted on this form and pages 1 thru 3 should be returned to the Buyer listed above at the District mailing address or fax number shown.

Note: If any of the "Standard Solicitation Provisions" and "General Terms and Conditions" on the following pages conflict with the requirements outlined in this Request For Quotation, the RFQ requirements will supersede those below.

STANDARD SOLICITATION PROVISIONS

- a. The Missouri Department of Transportation (MoDOT) reserves the right to reject any or all bids/quotes/proposals, and to accept or reject any items thereon, and to waive technicalities. In case of error in the extension of prices in the bid/quote/proposal, unit prices will govern.
- b. All bids/quotes/proposals must be signed with the firm name and by a responsible officer or employee. Obligations assumed by such signature must be fulfilled.
- c. By virtue of statutory authority, a preference will be given to materials, products, supplies, provisions and all other articles produced, manufactured, made or grown, within the State of Missouri.
- d. Time of delivery is a part of the consideration and, if not otherwise stated in the solicitation documents, must be stated in definite terms by the Bidder/Offeror and must be adhered to. If time varies on different items, the Bidder/Offeror shall so state.
- e. If providing bids/quotes/proposals for commodities, the Bidder/Offeror will state brand or make on each item. If bidding or proposing other than the make, model or brand specified, the manufacturer's name, model number or catalog number must be given.
- f. **For bids/proposals of \$25,000 or more**, no bids/proposals by telephone, telegram or telefax will be accepted. If provided, these bids/proposals should be returned in the MoDOT solicitation return envelope.
- g. If a solicitation return envelope is provided by MoDOT, the bid/quote/proposal should be returned in the envelope provided with the Bid/RFQ/RFP Request Number plainly indicated thereon.
- h. The date specified for the returning of bids/quotes/proposals is a firm deadline and all bids/quotes/proposals must be received at the designated office by that time. The Department does not recognize the U.S. Mail, Railway Express Agency, Air Express, or any other organization, as its agent for purposes of accepting proposals. All proposals arriving at the designated office after the deadline specified will be rejected.

GENERAL TERMS AND CONDITIONS

General Performance

- a. This work is to be performed under the general supervision and direction of the Missouri Department of Transportation (MoDOT) and, if awarded any portion of the work, the Contractor agrees to furnish at his own expense all labor and equipment required to complete the work, it being expressly understood that this solicitation is for completed work based upon the price(s) specified and is not a solicitation for rental of equipment or employment of labor by MoDOT, and MoDOT is to have no direction or control over the employees used by the Contractor in performance of the work.

Deliveries

- a. Unless otherwise specified on the solicitation documents or purchase order, suppliers shall give at least 24 hours advance notice of each delivery. Delivery will only be received between the hours of 8:00 a.m. to 3:00 p.m., Monday through Friday. Material arriving after 3:00 p.m. will not be unloaded until the following workday. No material will be received on Saturday, Sunday or state holidays.
- b. If the prices bid herein include the delivery cost of the material, the Contractor agrees to pay all transportation charges on the material as FOB - Destination. Freight costs must be included in the unit price bid and not listed as a separate line item.
- c. Any demurrage is to be paid by the Contractor direct to the railroad or carrier.

Nondiscrimination

- a. The Contractor shall comply with the Regulations relative to nondiscrimination in federally-assisted programs of the Department of Transportation, Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.
- b. All solicitations either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials or leases of the Contractor's obligations under this contract and the Regulations, will be relative to nondiscrimination on the grounds of race, color, or national origin.
 - 1) Sanctions for Noncompliance: In the event of the Contractor's noncompliance with the nondiscrimination provisions of this contract, MoDOT shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to:
 - i. withholding of payments to the Contractor under the contract until the Contractor complies, and/or,
 - ii. cancellation, termination or suspension of the contract, in whole or in part.

Contract/Purchase Order

- a. By submitting a bid/quote/proposal, the Bidder/Offeror agrees to furnish any and all equipment, supplies and/or services specified in the solicitation documents, at the prices quoted, pursuant to all requirements and specifications contained therein.
- b. A binding contract shall consist of: (1) the solicitation documents, amendments thereto, and/or Best and Final Offer (BAFO) request(s) with any changes/additions, (2) the Contractor's proposal and/or submitted pricing, and (3) the MHTC's acceptance of the proposal and/or bid by purchase order.

- c. A notice of award does not constitute an authorization for shipment of equipment or supplies or a directive to proceed with services. Before providing equipment, supplies and/or services, the Contractor must receive a properly authorized purchase order and/or notice to proceed.
- d. The contract expresses the complete agreement of the parties and performance shall be governed solely by the specifications and requirements contained therein. Any change, whether by modification and/or supplementation, must be accomplished by a formal contract amendment signed and approved by and between the duly authorized representative of the Contractor and the duly authorized representative of the MHTC, by a modified purchase order prior to the effective date of such modification. The Contractor expressly and explicitly understands and agrees that no other method and/or no other document, including correspondence, acts, and oral communications by or from any person, shall be used or construed as an amendment or modification.

Subcontracting

- a. It is specifically understood that no portion of the material or any interest in the contract, shall be subcontracted, transferred, assigned or otherwise disposed of, except with the written consent of MoDOT. Request for permission to subcontract or otherwise dispose of any part of the work shall be in writing to MoDOT and accompanied by a showing that the organization which will perform the work is particularly experienced and equipped for such work.
- b. Consent to subcontract or otherwise dispose of any portion of the work shall not be construed to relieve the Contractor of any responsibility for the production and delivery of the contracted work and the completion of the work within the specified time.
- c. All payments for work performed by a subcontractor shall be made to the Contractor to whom the contract was awarded and the purchase order issued.

Invoicing and Payment

- a. MoDOT is exempt from paying Missouri Sales Tax, Missouri Use Tax and Federal Excise Tax. However, the Contractor may themselves be responsible for the payment of taxes on materials they purchase to fulfill the contract. A Federal Excise Tax Exemption Certificate will be furnished to the successful Bidder/Offeror upon request.
- b. Each invoice should be itemized in accordance with items listed on the purchase order and/or contract. The statewide financial management system has been designed to capture certain receipt and payment information. Therefore, each invoice submitted must reference the purchase order number and must be itemized in accordance with items listed on the purchase order. Failure to comply with this requirement may delay processing of invoices for payment.
- c. Unless otherwise provided for in the solicitation documents, payment for all equipment, supplies, and/or services required herein shall be made in arrears. The Missouri Highways and Transportation Commission (MHTC) shall not make any advance deposits.
- d. The MHTC assumes no obligation for equipment, supplies, and/or services shipped or provided in excess of the quantity ordered. Any authorized quantity is subject to the MHTC's rejection and shall be returned at the Contractor's expense.
- e. The MHTC reserves the right to purchase goods and services using the state purchasing card.

Applicable Laws and Regulations

- a. The contract shall be construed according to the laws of the State of Missouri. The Contractor shall comply with all local, state, and federal laws and regulations related to the performance of the contract.
- b. The Contractor must be registered and maintain good standing with the Secretary of State of the State of Missouri and other regulatory agencies, as may be required by law or regulations. Prior to the issuance of a purchase order and/or notice to proceed, the Contractor may be required to submit to MoDOT a copy their current Authority Certificate from the Secretary of State of the State of Missouri.
 - 1) Prior to the issuance of a purchase order and/or notice to proceed, all **out-of-state** Contractors **providing services** within the state of Missouri must submit to MoDOT a copy of their current Transient Employer Certificate from the Department of Revenue, in addition to a copy of their current Authority Certificate from the Secretary of State of the State of Missouri.
- c. The contractor shall only utilize personnel authorized to work in the United States in accordance with applicable federal and state laws and Executive Order 07-13 for work performed in the United States.
- d. The exclusive venue for any legal proceeding relating to or arising, out of the contract shall be in the Circuit Court of Cole County, Missouri.

Preferences

- a. In the evaluation of bids/quotes/proposals, preferences shall be applied in accordance with Chapter 34 RsMO. Contractors should apply the same preferences in selecting subcontractors.
- b. By virtue of statutory authority, RsMO. 34.076 and 34.350 to 34.359, a preference will be given to materials, products, supplies, provisions and all other articles produced, manufactured, made or grown within the State of Missouri. Such preference shall be given when quality is equal or better and delivered price is the same or less.
 - 1) If attached, the document entitled "**PREFERENCE IN PURCHASING PRODUCTS**" must be completed and returned with the solicitation documents.
 - 2) If attached, the document entitled "**MISSOURI DOMESTIC PRODUCTS PROCUREMENT ACT**" must be completed and returned with the solicitation documents. **Applies if bid is Twenty-Five Thousand Dollars (\$25,000.00) or more**
- c. In the event of a tie of low bids, the MHTC reserves the right to establish the method to be used in determining the award

Remedies and Rights

- a. No provision in the contract shall be construed, expressly or implied a waiver by the MHTC of any existing or future right and/or remedy available by law in the event of any claim by the MHTC of the Contractor's default or breach of contract.
- b. The Contractor agrees and understands that the contract shall constitute an assignment by the Contractor to the MHTC of all rights, title and interest in and to all causes of action that the Contractor may have under the antitrust laws of the United States or State of Missouri for which causes of action have accrued or will accrue as the result of or in relation to the particular equipment, supplies, and/or services purchased or produced by the Contractor in the fulfillment of the contract with the MHTC.
- c. In the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the Contractor may request MoDOT to enter into such litigation to protect the interests of the MHTC, and, in addition, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

Cancellation of Contract

- a. The MHTC may cancel the contract at any time for a material breach of contractual obligations or for convenience by providing the Contractor with written notice of cancellation. Should the MHTC exercise its right to cancel the contract for such reasons, cancellation will become effective upon the date specified in the notice of cancellation sent to the Contractor.
- b. If the MHTC cancels the contract for breach, the MHTC reserves the right to obtain the equipment, supplies, and/or services to be provided pursuant to the contract from other sources and upon such terms and in such manner as the MHTC deems appropriate and charge the Contractor for any additional costs incurred thereby.

Bankruptcy or Insolvency

- a. Upon filing for any bankruptcy or insolvency proceeding by or against the Contractor, whether voluntary or involuntary, or upon the appointment of a receiver, trustee, or assigned the benefit or creditors, the Contractor must notify MoDOT immediately. Upon learning of any such actions, the MHTC reserves the right, at its sole discretion, to either cancel the contract or affirm the contract and hold the Contractor responsible for damages.

Inventions, Patents, and Copyrights

- a. The Contractor shall defend, protect, and hold harmless the MHTC, its officers, agents, and employees against all suits of law or in equity resulting from patent and copyright infringement concerning the Contractor's performance or products produced under the terms of the contract.

Inspection and Acceptance

- a. No equipment, supplies, and/or services received by MoDOT pursuant to a contract shall be deemed accepted until MoDOT has had reasonable opportunity to inspect said equipment, supplies, and/or services.
- b. All equipment, supplies, and/or services which do not comply with the specifications and/or requirements or which are otherwise unacceptable or defective may be rejected. In addition, all equipment, supplies, and/or services which are discovered to be defective or which do not conform to any warranty of the Contractor upon inspection (or at any later time if the defects contained were not reasonably ascertainable upon the initial inspection) may be rejected.
- c. The MHTC reserves the right to return any such rejected shipment at the Contractor's expense for full credit or replacement and to specify a reasonable date by which replacements must be received.
- d. The MHTC's right to reject any unacceptable equipment, supplies, and/or services shall not exclude any other legal, equitable or contractual remedies the MHTC may have.

Warranty

- a. The Contractor expressly warrants that all equipment, supplies, and/or services provided shall: (1) conform to each and every specification, drawing, sample or other description which was furnished to or adopted by MoDOT, (2) be fit and sufficient for the purpose expressed in the solicitation documents, (3) be merchantable, (4) be of good materials and workmanship, and (5) be free from defect.
- b. Such warranty shall survive delivery and shall not be deemed waived either by reason of the MHTC's acceptance of or payment for said equipment, supplies, and/or services.

Status of Independent Contractor

- a. The Contractor represents itself to be an independent Contractor offering such services to the general public and shall not represent itself or its employees to be an employee of the MHTC. Therefore, the Contractor shall assume all legal and financial responsibility for taxes, FICA, employee fringe benefits, workers' compensation, employee insurance, minimum wage requirements, overtime, etc., and agrees to indemnify, save and hold the MHTC, its officers, agents and employees harmless from and against any and all losses (including attorney fees) and damage of any kind related to such matter.

Indemnification

- a. The Offeror shall defend, indemnify and hold harmless the Commission, including its members and department employees, from any claim or liability whether based on a claim for damages to real or personal property or to a person for any matter relating to or arising out of the Offeror's performance of its obligation under this Agreement.

THANK YOU

DATE: _____

FROM: _____ (Company Name)
 _____ (Mailing Address)
 _____ (City, State, Zip Code)
 _____ (Office Phone #)
 _____ (Cellular Phone #)
 _____ (Fax #)

() Product or service is not available or cannot meet the required specifications

() Other obligations – cannot make required deadline

() The delivery point or work location is outside of our territory or coverage/service area

() Other – Please explain below:

Contact Person: _____ Email Address: _____

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CORRUGATED METALLIC-COATED STEEL CULVERT PIPE, PIPE-ARCHES AND END SECTIONS MGS-91-11G

1.0 DESCRIPTION. These specifications cover the purchase of metallic-coated corrugated metal culvert pipe and appurtenances for maintenance purposes.

2.0 MATERIALS.

2.1 PIPE.

2.1.1 The pipe and connecting bands shall comply with applicable sections of Specification Sec 725, 1020 and 1022, except as noted herein.

2.1.2 Unless otherwise noted in the bid request, the metallic coating may be either zinc or aluminum, as covered by the applicable specifications listed herein.

2.1.3 All pipe shall have either 2 2/3 by 1/2 inch or 3 by 1 inch corrugations.

2.1.4 The specified thickness of the coated sheet shall be any of those listed for the allowable overfill heights shown in Standard Plan 725.00A Table 1, for the pipe diameter specified and the corrugation used.

2.1.5 All pipe ends shall have 2 2/3 by 1/2 inch annular corrugations extending at least 4 corrugations from the pipe end. This will require re-rolling of ends for certain pipe.

2.1.6 Metal arch pipe B1 through B4 shall comply with the dimensional requirements of AASHTO M 36.

2.2 BANDS.

2.2.1 Unless otherwise noted in the order, bands shall be annular corrugated over the entire width of the band with 2 2/3 by 1/2 inch corrugations.

2.2.2 Unless otherwise noted in the order, all bands shall be a minimum of 24 inches in width.

3.0 ORDERING INFORMATION.

3.1 Specific diameter and quantity information for pipe and bands, and lengths for pipe, are to be shown in the order. Acceptable diameters are shown in Specification Sec 725. Pipe lengths are to be in 2 foot increments.

3.2 Specific band information for type and width is to be shown in the order only if different from that specified herein. Alternate band types are dimple or formed, when allowed by the order.

3.3 If a specific metallic coating is desired, it is to be specified in the order for the applicable pipe and any applicable bands as "Zinc Coated" or "Aluminum Coated".

4.0 ACCEPTANCE. Material will be accepted in accordance with Specification Sec 1020.



SECTION 725

METAL PIPE AND PIPE ARCH CULVERTS

725.1 Description. This work shall consist of providing corrugated metal pipe or pipe arch of the diameter or shape designated, laid upon a firm bed and backfilled as specified. Where pipe is referred to, this specification will also apply to pipe-arch, where appropriate.

725.1.1 The contract will specify either the type of pipe or the group of permissible types of pipe. If a group of permissible types is specified, the contractor may use any of the types listed within the specified group as follows:

Group A	Reinforced Concrete Culvert Pipe Vitrified Clay Culvert and Sewer Pipe
Group B	Reinforced Concrete Culvert Pipe Vitrified Clay Culvert and Sewer Pipe Polymer Coated Corrugated Metal Culvert Pipe Corrugated Aluminum Alloy Culvert Pipe Corrugated Polyethylene Culvert Pipe Corrugated PVC Culvert Pipe Corrugated Aluminum-Coated Steel Culvert Pipe
Group C	Reinforced Concrete Culvert Pipe Vitrified Clay Culvert and Sewer Pipe Polymer Coated Corrugated Metal Culvert Pipe Corrugated Aluminum Alloy Culvert Pipe Corrugated Polyethylene Culvert Pipe Corrugated PVC Culvert Pipe Bituminous Coated Corrugated Metal Culvert Pipe Corrugated Aluminum-Coated Steel Culvert Pipe Corrugated Zinc-Coated Steel Culvert Pipe

725.1.2 If the contract specifies corrugated metallic-coated steel pipe culverts of 60-inch (1500 mm) diameter or larger, the contractor may substitute structural plate pipe of like sizes, lengths and thicknesses of steel, constructed in accordance with Sec 727, at the contractor's expense.

725.1.3 If the contract specifies corrugated metallic-coated steel pipe or corrugated aluminum alloy pipe, or if the contract specifies pipe culverts by group and the contractor elects to furnish corrugated metallic-coated steel pipe or corrugated aluminum alloy pipe, the thickness of metal and size of corrugation for the respective pipe size shall be as shown on the plans unless otherwise specified. The overfill height shown on the plans or in the contract shall be used to determine the proper sheet thickness and size of corrugation for the individual pipe culvert. The minimum cover shall be measured as shown on the plans.

725.1.4 If the contract specifies pipe culverts by group and the contractor elects to furnish vitrified clay or reinforced concrete pipe, the culvert shall be constructed in accordance with Sec 726. If the contractor elects to furnish corrugated PVC culvert pipe, the culvert shall be

constructed in accordance with Sec 728. If the contractor elects to furnish corrugated polyethylene pipe, the culvert shall be constructed in accordance with Sec 730.

725.1.5 When Group B and Group C pipe are specified, two pipe diameters will be shown on the plans at those locations. The first dimension will indicate the diameter of pipe that shall be provided if the contractor elects to provide pipe for that location with a corrugated interior wall, and the second dimension provided in parenthesis will indicate the diameter of pipe that shall be provided if the contractor elects to provide pipe for that location with a smooth interior wall. The specified diameters may be the same or different and will be dependent upon the design features for that pipe location. Regardless of which diameter of pipe is selected for a given location, the pipe flow line shall be maintained at the elevations shown on the plans.

725.1.6 Pipe used for storm sewers may be any of the pipe listed under Group B pipe, with the following exceptions. All corrugated metal culvert pipes shall be Type IA or Type IR. Sewer pipe placed beneath the paved portion of roadways with average daily traffic greater than 3500 vehicles per day shall be Group A pipe. No other substitutions will be allowed, regardless of what type or group of pipe is specified for storm sewers outside of the paved portion for these roadways.

725.2 Material. All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

Item	Section
Corrugated Metallic-Coated Steel Culvert Pipe, Pipe-Arches and End Sections	1020
Bituminous Coated Corrugated Metal Culvert Pipe, Pipe Arch and End Sections	1021
Corrugated Aluminum Alloy Culvert Pipe	1024
Polymer Coated Corrugated Metal Culvert Pipe and Pipe Arches	1027

725.3 Construction Requirements.

725.3.1 Handling. All pipe shall be handled to avoid damage. Pipe having damaged coating, any localized bends in excess of five percent of the specified pipe diameter, or any dent in excess of 1/2 inch (13 mm) will be rejected, regardless of previous approvals. Rejected damaged pipe may be used if repaired to the satisfaction of the engineer.

725.3.2 Laying Pipe.

725.3.2.1 The pipe shall be carefully laid true to lines and grades shown on the plans. Riveted pipe shall be installed with the outside laps of circumferential joints pointing upstream and with no longitudinal lap placed on the bottom 120 degrees of the pipe on the sides. Any pipe that is not in true alignment or that shows any undue settlement after laying shall be taken up and re-laid at the contractor's expense. If shown on the plans or directed by the engineer, camber shall be built into the pipe structure to compensate for settlement from fill loads.

725.3.2.2 Transverse field joints shall be of such design that the successive connection of pipe sections will form a continuous line free from appreciable irregularities in the flow line. Each successive length of pipe in a field joint shall be adjusted longitudinally or circumferentially when necessary such that coupling bands will properly engage the corrugations in both lengths of pipe.

725.3.3 Bedding And Backfill Material.

725.3.3.1 Backfill material for metal culverts shall consist of crushed stone, gravel, sand or sandy silt.

725.3.3.1.1 Crushed stone, gravel and sand shall consist of a well-graded mixture of stone fragments, gravel and sand, and shall be in accordance with AASHTO M 145, Classification A1 or A3.

725.3.3.1.2 Sandy silt soil shall consist of moderately plastic granular material with silt content higher than that of gravel or sand and shall be in accordance with AASHTO M 145, Classification A2.

725.3.3.2 Bedding material shall have a maximum particle size of 1 1/2 inches (38 mm). Backfill shall be free of organic material or frozen clumps, and shall not contain stones larger than 3 inches (75 mm).

725.3.4 Installation.

725.3.4.1 Installation of Pipe for Non-Embankment Conditions. The construction sequence shall be as follows. The trench shall be excavated to the width, depth and grade shown on the plans or as directed by the engineer. Proper preparation of foundation, placement of foundation material where required and placement of bedding material shall precede the installation of all culvert pipe. Proper preparation shall include necessary leveling of the trench bottom or the top of the foundation material as well as placement and compaction of required bedding material to a uniform grade such that the entire length of pipe will be supported on a uniform base. The material in the haunch and lower side zones shall then be placed and compacted up to the springline of the pipe.

725.3.4.2 Installation of Pipe Prior to Placing Embankment. After the pipe has been laid, the material in the haunch and lower side zones shall be placed to a minimum width of one pipe diameter outside the pipe, except for pipe-arches, where placement of material shall be limited to a maximum of two-thirds the span. The pipe shall be installed and backfilled in accordance with Sec 725.3.4.1. If a subtrench will be required to install the pipe to the specified grade, the width of the trench shall be as shown on the plans. Sufficient clearance shall be provided in order to attain the required compaction in the haunch and outer bedding zones.

725.3.4.3 Installation of Pipe After Placing Embankment. The roadway embankment shall be placed and compacted to the required density to a minimum elevation of one foot (300 mm) above the top of the pipe. A trench shall be excavated through the embankment to a depth sufficient to place the required bedding and to maintain the specified grade of the pipe, in accordance with the section shown on the plans. The pipe shall be installed and backfilled in accordance with Sec 725.3.4.1.

725.3.4.4 Bedding in Unsuitable Material. If rock is encountered, the bedding depth shall be increased as shown on the plans. If soft, spongy or unstable material is encountered, the material shall be removed and replaced with approved fill, compacted to the specified level. Payment for removal of unsuitable material and for backfilling will be made in accordance with Sec 206.6.3, unless the unsuitable material is a result of the contractor's operations, in which case the removal and backfilling will be at the contractor's expense.

725.3.4.5 Backfill. Backfill shall be placed as soon as practical in accordance with Sec 206. Suitable backfill and embankment material, free from large lumps, clods or rocks, shall be compacted in accordance with Sec 203. Care shall be taken to properly compact the backfill under the haunches of pipe-arch. The placement of the remainder of the backfill shall be a

minimum of one foot (300 mm) above the top of the pipe and shall be brought up evenly on both sides of the pipe by working backfill operations from side to side. The side-to-side backfill differential shall not exceed 24 inches (0.6 m) or one-third of the size of the pipe, whichever is less. Additional backfill shall be provided as necessary. After backfilling, the pipe shall have a smooth, uniform concentric shape.

725.3.4.6 Shop Elongation. Round corrugated steel pipe 48 inches (1200 mm) or greater in diameter may be furnished round or shop elongated. The contractor shall maintain elongation during backfilling and embankment construction such that the vertical height of the opening after the embankment has been completed shall be no less than the diameter of the pipe or greater than the pre-elongated height.

725.3.4.7 Construction Loads. Before heavy construction equipment is operated over the pipe, the contractor shall provide adequate depth and width of compacted backfill or other cover to protect the pipe from damage or displacement. Any damage or displacement shall be repaired or corrected at the contractor's expense.

725.3.4.8 Pipe Plugs. The ends of all pipe stubs for future connections at inlet and manhole structures, and all pipe installed as part of future sewers, shall be sealed with approved plugs. The plugs shall be installed in such a manner that infiltration of soil into the pipe is prevented.

725.3.5 Corrugated Metal Drop Inlets. The contractor shall install corrugated metal drop inlets of the proper size and length at the locations shown on the plans. The drop inlet shall be constructed of the same base metal and thickness of corrugated metal used in the culvert pipe and shall be in accordance with Sec 1020 or Sec 1024.

725.3.6 Corrugated Metal Curtain Walls. The contractor shall install metal curtain walls of the proper size and shape at locations shown on the plans. Metal curtain walls shall be constructed of the same base metal used in the culvert pipe, shall be of the thickness of metal shown on the plans and shall be in accordance with Sec 1020 or Sec 1024.

725.4 Inspection. The internal diameter of the barrel shall not be reduced by more than 10 percent of the pipe's nominal inside diameter when measured no less than 30 days following completion of installation. After the roadway has been completed and before final inspection of the project, the engineer will inspect all pipe locations for proper installation. Any section of pipe found to be improperly installed shall be replaced or repaired by the contractor, at the contractor's expense and to the satisfaction of the engineer. Repaired or replaced pipe will be re-inspected by the engineer. The contractor shall provide equipment and assistance deemed necessary by the engineer to perform any testing. Pipe deflections will be determined by the engineer by having the contractor either pushing or pulling a mandrel through the pipe or verifying deflections by other methods approved by the engineer. Mandrels used for deflection testing may have either fixed or adjustable arms, but shall be approved by the engineer prior to use. The following will constitute improper installation:

(a) If any horizontal or vertical alignment is in excess of 15 percent from plan alignment, will restrict flow or will cause excessive ponding within the pipe.

(b) Any section of pipe with a diameter deflection greater than 10 percent, based upon the units of measurement used in fabricating the pipe.

(c) If settlement is greater than one inch (25 mm) at 5 percent or more joints.

(d) If the pipe shows evidence of being crushed at any location.

- (e) If the pipe shows evidence of joint separation.

Method of Measurement.

725.5.1 Final measurement will not be made except for authorized changes during construction or where appreciable errors are found in the contract quantity. When two different diameters of pipe are shown on the plans for a given location for Group B or Group C pipe, the quantity of pipe installed will be based on the plan quantity for the larger diameter pipe and will not be considered as an appreciable error in the contract quantity if the smaller allowed diameter pipe is used. Where required, measurement of corrugated metal pipe or pipe-arch, complete in place, will be made to the nearest foot (0.5 m) along the geometrical center of the pipe. The revision or correction will be computed and added to or deducted from the contract quantity.

725.5.2 Excavation for placing pipe, pipe-arches, corrugated metal drop inlets and metal curtain walls will not be measured, except when excavation for the installation is shown on the plans.

725.6 Basis of Payment.

725.6.1 The accepted quantities of pipe, complete in place, including all necessary tees, bends, wyes, coupling bands, cutting and joining new pipe to existing pipe or structures, unless otherwise specified, will be paid for at the contract unit price for each of the pay items included in the contract.

725.6.2 The accepted quantities of corrugated metal drop inlets and metal curtain walls, complete in place, including coupling bands, toeplates, nuts and bolts will be paid for at the contract unit price for each of the pay items included in the contract.

725.6.3 Unless specified otherwise, no direct payment will be made for the following:

- (a) Beveling, skewing or additional work required in laying pipe with beveled or skewed ends.
- (b) Work involved in elongating pipe.
- (c) Any required backfilling, except as specified in Sec 206.6.3.
- (d) Construction of bedding or for bedding material.
- (e) Trench excavation and backfilling, except when Class 3 Excavation is shown on the plans for a given pipe location. When shown on the plans, payment for Class 3 Excavation will be made for in accordance with Sec 206.
- (f) Furnishing and installing plugs.
- (g) Work or equipment to perform deflection testing.



SECTION 1020

CORRUGATED METALLIC-COATED STEEL CULVERT PIPE, PIPE-ARCHES AND END SECTIONS

1020.1 Scope. This specification covers corrugated steel pipe, pipe-arches and flared end sections intended for use in the construction of culverts and similar uses. The steel used in fabrication shall have a protective metallic coating of zinc (galvanizing) or aluminum.

1020.2 Basis of Acceptance. Unless otherwise specified, the basis of acceptance will be in accordance with AASHTO M 36. Pipe shall be from an approved qualified plant and will be accepted based on certification, manufacturer quality control documentation and tests on samples as required by the engineer. Pipe may be fabricated using English units of measurement. Pipe fabricated using English measurements shall be in accordance with the dimensions and tolerances shown on the plans.

1020.3 Material.

1020.3.1 Steel Sheet. Steel sheet shall be certifiable in accordance with AASHTO M 218 or AASHTO M 274. Finished steel sheet shall be free from injurious defects such as blisters, flux and uncoated spots.

1020.3.2 Zinc Coating. Zinc for coating or galvanizing shall be prime western grade or better. Zinc-coated steel shall have a weight (mass) of zinc coating no less than 2.00 ounces psf (610 g/m²) of double exposed surface. If the average weight of zinc coating, as determined from the required samples, is less than 2.00 ounces psf (610 g/m²), or if any one specimen has less than 1.80 ounces of zinc psf (550 g/m²) of double exposed surface, the lot sampled will be rejected or resampled, as determined by the engineer. If a retest is conducted, the weight (mass) of zinc coating of all of the original samples and the samples for retest shall average at least 2.00 ounces psf (610 g/m²) of double exposed surface, and no specimen shall have less than 1.80 ounces psf (550 g/m²), or the entire lot sampled will be rejected. Adherence of coating shall be such that no peeling occurs while the material is being corrugated or formed into pipe.

1020.3.3 Aluminum Coating. Aluminum for coating shall be commercially pure aluminum. The bath analysis shall be in accordance with the *Aluminum Bath Analysis* table shown on the plans. Aluminum-coated steel shall have a weight (mass) of aluminum coating no less than 1.00 ounce psf (305 g/m²) of double exposed surface. If the average weight (mass) of aluminum coating, as determined from the required samples, is less than 1.00 ounce psf (305 g/m²) or if any one specimen has less than 0.90 ounce of aluminum psf (270 g/m²) of double exposed surface, the lot sampled will be rejected or resampled, as determined by the engineer. If a retest is conducted, the weight (mass) of aluminum coating of all of the original samples and the samples for retest shall average at least 1.00 ounce psf (305 g/m²) of double exposed surface and no specimen shall have less than 0.90 ounce psf (270 g/m²) or the entire lot sampled will be rejected.

1020.3.4 Documentation.

1020.3.4.1 Sheet Manufacturer's Certified Analysis. The manufacturer of each brand shall file with Construction and Materials a certificate setting forth the name or brand of metal to be

furnished, the specified chemical composition and a typical or average analysis showing the percent of carbon, phosphorus, manganese, sulfur and silicon. The certificate shall be sworn to, for the manufacturer, by a person having legal authority to bind the company.

1020.3.4.2 Sheet Manufacturer's Guarantee. The manufacturer of the steel sheet shall submit with the certified analysis a guarantee providing that all metal furnished is in accordance with the specification requirements, shall bear a suitable identification brand or mark and shall be replaced without cost to the Commission when not in accordance with the specified analysis, sheet thickness or coating. The guarantee shall be so worded as to remain in effect as long as the manufacturer continues to furnish material. The manufacturer shall conduct such tests and measurements as necessary to ensure the material produced is in accordance with all specification requirements. These tests and measurements shall be identified by the identification symbols or code used on the sheet in a manner that will permit the manufacturer to produce specific reports showing test results representative of specific lots of steel sheet. Copies of reports of these tests shall be kept on file and shall be submitted to the engineer upon request. The brand shall be removed or obliterated by the manufacturer on all material where control tests, as outlined herein, do not show conformance to this specification.

1020.4 Fabrication.

1020.4.1 Riveted Seams. A longitudinal seam will not be permitted on the corner radius or invert of pipe-arch.

1020.4.2 Resistance Spot Welded Seams. A longitudinal seam will not be permitted on the corner radius or invert of pipe arch.

1020.4.3 Shop Elongation. If round pipe is required to be shop elongated, the vertical axis shall be five percent greater than the nominal diameter. A tolerance of one percentage point in elongation will be permitted. Approximately 2 feet (600 mm) at each end of an installation may be left round to accommodate connecting end treatments or extensions. A paint mark to indicate the top of the pipe shall be placed on each piece of shop elongated pipe, and round ends on an elongated pipe shall be clearly marked "Outside End-Round".

1020.4.4 Beveled Ends. Corrugated metal pipe requiring beveled ends to conform to the adjacent roadway slope shall be cut in such a manner as to leave smooth edges without damage to the coating away from the cut edge. Cut edges shall be completely covered with two coats of single component inorganic zinc or organic zinc-rich paint meeting the approval of the engineer. No other end finish will be required for pipe with beveled ends.

1020.4.5 End Sections. Metal end sections shall be in accordance with the requirements for base metal, coating, fabrication, sampling, accepted brands of metal, sheet manufacturer's certified analysis, sheet manufacturer's guarantee, sheet thickness, workmanship and repair of coating. The sections shall conform to the shape, dimensions and sheet thicknesses shown on the plans, and shall be manufactured as integral units or so the sections may be readily assembled in place.

1020.4.6 Bands. Formed bands may be used on pipe with annular corrugations and helically corrugated pipe with reformed ends. Bands shall be formed with a minimum of two corrugations matching the profile of the pipes being joined together. The corrugations shall be spaced to provide seating in the second corrugation of each pipe and without creating more than 1/2-inch (13 mm) annular space between the pipe ends when joined together.

1020.4.6.1 Circumferentially corrugated bands, bands with projections and helically corrugated bands shall be so constructed as to lap on an equal portion of each of the culvert

sections and shall be connected at the ends by galvanized angles having minimum dimensions of 2 x 2 x 3/16 inch (50 x 50 x 5 mm), fastened with galvanized bolts of 1/2-inch (13 mm) minimum diameter. Formed bands shall be fastened together by two 1/2-inch (13 mm) bolts through a bar, and strap welded to the band. Angles shall be secured to the coupling bands by riveting, welding, resistance spot welding or a method approved by the engineer at each corrugation. Rivets shall be placed such that the head of the rivet will be on the inside of the band. Welds, except for resistance spot welds, shall be painted with one coat of zinc dust-zinc oxide or zinc-rich paint meeting the approval of the engineer. The 7-inch and 10 1/2-inch (180 mm and 254 mm) bands shall have at least two fastening bolts, the 12-inch and 14-inch (300 mm and 350 mm) bands shall have at least three fastening bolts and the 16 1/4-inch (415 mm) or greater bands shall have at least four fastening bolts. Alternate methods of fastening the ends of coupling bands may be used if approved by the engineer. Coupling bands for pipe-arch and shop elongated pipe shall be shaped to fit the structure.

1020.4.6.2 As an alternate to coupling bands, a bell and spigot joint system may be used as approved by Construction and Materials.

1020.4.7 Special Fittings. Special fittings, angles and tees shown on the plans shall be fabricated by welding in such a manner as to avoid excessive damage to the coating away from the welded area. The welded area and adjacent damaged coating shall be repaired in accordance with Sec 1020.6.

1020.5 Sampling, Testing and Acceptance Procedures. All fabrication plants furnishing pipe for MoDOT projects shall be qualified as herein described. A pipe distributor, who does not fabricate pipe, may attain qualification as set forth for a pipe manufacturer or may furnish pipe for MoDOT projects that is marked and certified from an approved plant. All pipe will be subject to inspection by the engineer at the source of manufacture, at an intermediate shipping terminal or at destination. The engineer shall be allowed unlimited access to all facilities and records, as required, to conduct inspection and sampling in accordance with Sec 106.

1020.5.1 Application for Placement on the Qualified List. For a plant to become qualified, a written request shall be sent by the manufacturer to Construction and Materials with the following information:

- (a) A QC Plan, in accordance with Sec 1020.5.2, for each plant from which pipe is to be fabricated for use on MoDOT projects.
- (b) A certification statement from the manufacturer that the quality control procedures at the plant, at a minimum, meet the requirements set forth in the manufacturer's QC Plan.
- (c) Sources for each material to be used in the fabrication of pipe shall be provided.
- (d) A guarantee that all material to be used in the fabrication of pipe will be in accordance with MoDOT specifications and that pre-approval for any source of material will be received prior to use.
- (e) Units of measurement, English or metric, used to fabricate the pipe.

1020.5.2 Manufacturer's QC Plans. The QC Plan for each plant shall include the following:

- (a) A list of personnel with corresponding authority and responsibility.

(b) Qualifications and training of QC personnel, current and proposed.

(c) A description of how the manufacturer proposes to control production in order to assure all material and workmanship incorporated into the fabrication of pipe meets the applicable specification requirements.

(d) Lot sizes, the specific tests to be performed during or after production, frequency of these tests, the point where samples or inspections will be obtained or performed, and the format for recording test data.

(e) A drawing, photograph or copy of the manufacturer's identification marking.

(f) A plan for resolving conflicts.

(g) Designate how the pipe will be identified as pipe for MoDOT projects if the pipe is stockpiled and not marked in accordance with Sec 1020.7.

1020.5.3 Maintaining Qualification. To maintain qualification, the manufacturer and plant shall perform and maintain quality control in accordance with the manufacturer's QC Plan approved by Construction and Materials. The manufacturer or plant shall conduct tests and inspections to verify that adequate quality control is maintained and that the pipe furnished is in accordance with Sec 1020. The manufacturer or plant shall maintain for three years a record of all test results and inspections for review by the engineer. The records shall show that each shipment of pipe has been inspected by the plant's QC personnel. The record shall indicate the purchase order number or the project number, route, county, date of inspection, size of corrugation, type of fabrication, quantity in lineal feet (m), number of bands and end sections, pipe diameter, sheet thickness, brand and heat number of the base metal, and the coating lot number. The manufacturer or plant shall notify the engineer responsible for inspection of that plant at least 24 hours prior to each shipment. Additional pipe may be considered part of the original shipment when the ordered quantity was underestimated or material was lost or damaged. A bill of lading in accordance with Sec 1020.10 shall be provided for each shipment of pipe. Each plant shall maintain a current list of QC personnel with corresponding authority and responsibility. All training provided to QC personnel shall be documented with a brief description of the training and shall be kept on file at the plant.

1020.5.4 Disqualification of a Manufacturer or Plant. A manufacturer or plant may be disqualified to provide pipe for use on MoDOT projects based on the discretion of Construction and Materials, for reasons including, but not limited to, noncompliance with the manufacturer's QC Plan, failure of pipe to consistently meet specifications, falsification of documentation, unsatisfactory performance in the field or for other reasons indicating lack of consistent material or workmanship quality.

1020.5.4.1 A manufacturer or plant will not be considered for reinstatement until after one year from the date of removal for falsification of documents.

1020.5.4.2 Three notices of failure to meet the specification requirements within a 12-month period will be cause for disqualification of a plant for one year, effective from the date of the third notice.

1020.5.4.3 A manufacturer having two or more plants disqualified will constitute disqualification of the manufacturer for one year.

1020.5.4.4 A manufacturer or plant disqualified within one year of the end of a disqualification may be subject to permanent removal, with no application to be reinstated for a period of three years.

1020.5.5 Reinstatement of a Manufacturer or Plant. Consideration of reinstatement of a manufacturer or a plant once disqualified will be no sooner than specified in Sec 1020.5.4, will require a written document from the manufacturer or plant stating the reasons for disqualification and the action taken to correct those deficiencies, written concurrence from Construction and Materials that the problem has been suitably addressed, and followed by an application in accordance with Sec 1020.5.1.

1020.5.6 Sampling of Material. Random sampling of the pipe or material used in the production of pipe will be conducted by the engineer to verify if the pipe and material are in accordance with the applicable specifications. Sampling size and frequency will be at the discretion of the engineer. In the event pipe materials certified by the manufacturer are not in accordance with Sec 1020 as determined by random sampling, testing and inspection, all pipe incorporating that material will be rejected.

1020.5.7 Mill and Factory Inspection. The engineer may have the material inspected and sampled in the rolling mill or in the shop where fabricated. The engineer may require from the mill the chemical analysis of any heat number. The inspection, either in the mill or in the shop, shall be under the direction of the engineer. The engineer shall have unlimited access to the mill or shop for inspection, and every facility shall be extended for the purpose of inspection. Any material or pipe that has been previously rejected at the mill or shop and included in a later lot will be considered sufficient cause for rejection of the entire lot.

1020.5.8 Inspection. Inspection by the engineer will include an examination of the pipe for deficiency in specified diameter, net length of finished pipe and any evidence of poor workmanship. The inspection may include taking samples for chemical analysis, mechanical properties and determination of weight (mass) of coating. The pipe making up the shipment shall meet all requirements of these specifications. If 10 percent of the pipe in any lot fails to meet these requirements, the entire lot may be rejected.

1020.5.9 Sampling of Coated Steel. Samples of coated steel sheet may be obtained from coils, flat or corrugated cut lengths or fabricated culverts. Samples shall be taken at a frequency determined by the manufacturer's QC Plan or as required by the engineer.

1020.5.9.1 For testing weight (mass) of coating of flat or corrugated cut lengths before fabrication, three specimens, each no less than 2 1/4 inches (60 mm) square or of an equivalent area, shall be taken from each test sheet selected to represent the lot. The specimens shall be taken such that no part includes metal closer than 2 inches (50 mm) from an edge or 4 inches (100 mm) from an end of the cut length. These specimens shall be obtained in any one of the following patterns:

(a) One specimen shall be obtained from the center of the cut length and the other two in a straight line diagonally at the opposite corners.

(b) Specimens shall be taken in a straight line from one end of the cut length, one from the middle portion and one from near each edge.

1020.5.9.2 For testing weight (mass) of coating of coils before fabrication, three specimens, each no less than 2 1/4 inches (60 mm) square or of an equivalent area, shall be taken, one from the middle of the width and one from each side. No specimen shall be taken closer than 2 inches (50 mm) from an edge or 4 inches (100 mm) from an end of the coil.

1020.5.9.3 For testing weight (mass) of coating of fabricated pipe or pipe-arch, at least one specimen 2 1/4 inches (60 mm) square or of equivalent area, shall be selected for each 20 pieces of pipe within a given lot selected to be tested, provided that no less than three specimens, each from a different piece, shall represent any one lot. The three specimens shall constitute one sample and shall be in accordance with Sec 1020.3.

1020.5.9.4 For chemical analysis of the base metal of flat or corrugated cut lengths before fabrication, a specimen, no less than 2 1/4 inches (60 mm) square or of an equivalent area, shall be taken from each of three different cut lengths for lots weighing 5 tons (having a mass of 5 Mg) or less, from four cut lengths for lots weighing more than 5 tons and less than 10 tons (having a mass of more than 5 Mg and less than 10 Mg) and from five cut lengths for lots weighing 10 tons (having a mass of 10 Mg) or more. Drillings or chips from the specimens shall be thoroughly mixed for analysis.

1020.5.9.5 For chemical analysis of the base metal of coils, three specimens, each no less than 2 1/4 inches (60 mm) square or of an equivalent area, shall be taken from across the width of the coil, or if more than one mill lift or coil is involved, three specimens shall be selected from each of at least two different coils. Drillings or chips from the specimens shall be thoroughly mixed for analysis.

1020.5.9.6 When chemical analysis of base metal of fabricated pipe or pipe-arch is required, the analysis shall be performed on the same specimens taken for determination of weight (mass) of coating.

1020.5.9.7 For testing mechanical properties of the base metal, two specimens, each 4 x 14 inches (100 x 355 mm), shall be taken from one end of a cut length or coil. The 14-inch (355 mm) dimension shall be in the longitudinal direction of the steel sheet. No specimen shall be taken closer than 2 inches (50 mm) from an edge or 4 inches (100 mm) from an end of a sheet.

1020.5.9.8 Samples for retest of weight (mass) of coating on cut lengths shall be taken in accordance with pattern (a) of Sec 1020.5.9.1. Samples for retest of mechanical properties or chemical composition of any base metal or retest of weight (mass) of coating on coils or fabricated pipe or pipe-arch shall be taken in the same manner as for the original test.

1020.5.10 Testing of Metallic-Coated Steel. Tests for weight (mass) of coating, chemical composition and mechanical properties of metallic-coated steel sheets shall be as herein specified.

1020.5.10.1 Test specimen size and method of test for determining weight (mass) of coating shall be in accordance with AASHTO T 65 for zinc coatings, and AASHTO T 213 for aluminum coatings. At the option of the engineer, material may be accepted on the basis of magnetic gauge determinations made in accordance with ASTM E 376.

1020.5.10.2 The method of test for chemical analysis shall be in accordance with ASTM E 30-68, exclusive of any later revisions or additions.

1020.5.10.3 Test specimen size and method of test for determining tensile strength, yield strength and elongation shall be in accordance with ASTM A 370 for sheet steel.

1020.5.11 Acceptance of Metallic-Coated Steel Sheet. Acceptance of metallic-coated steel sheet will be based on a satisfactory sheet manufacturer's certified analysis and guarantee and sheet identification markings, upon tests on samples of the material, or upon both. The frequency of sampling will be determined by the engineer. The fabricator shall provide the equipment and personnel required to obtain the samples as directed by the engineer.

1020.5.12 Accepted Brands of Metal. No metal will be accepted under these specifications until the sheet manufacturer's certified analysis and manufacturer's guarantee have been approved by the engineer. Misbranding or other misrepresentation and non-uniformity of product, will each be considered sufficient reason to discontinue the acceptance of any brand under these specifications, and notice sent to the sheet manufacturer of the discontinuance of acceptance of any brand will be considered to be notice to all culvert companies that handle that particular brand.

1020.5.13 Sampling and Testing of Continuous Lock Seam. Sampling and testing for continuous lock seam quality control shall be in accordance with AASHTO T 249.

1020.5.13.1 The pipe manufacturer or plant shall cut, log and retain quality control samples, which shall be retained for two years. Visual examination samples for quality control shall be cut during production. The manufacturer or plant shall sample a minimum of one lock per coil when the same diameter of pipe is being produced. The samples shall be taken from the beginning of the coil. If diameters are changed within a coil, at least one lock per diameter shall be taken. Quality control tension test specimens shall be taken from pipe representing each sheet thickness and diameter the first time that sheet thickness and diameter is produced. In addition, each sheet thickness thereafter shall be sampled on a monthly basis during production for tension testing of the seam. The manufacturer or plant shall record all tension test results and retain those records for two years.

1020.5.13.2 Inspection by the engineer will include random visual examination samples and tension test samples taken in the presence of the engineer. If visual examination samples indicate nonconformance, that length of the pipe will be rejected, and a resample will be taken from a different length of pipe of the same sheet thickness of the same diameter. If the resample fails, each shipment of that sheet thickness thereafter shall be sampled for visual examination and tension testing until the engineer determines that satisfactory quality control is established. Pipe from which tension test specimens have been taken may be cut and the undamaged portion accepted for use.

1020.6 Repair of Damaged Coating. Damaged coating on pipe shall be repaired in accordance with AASHTO M 36, except as follows. Coating damaged in the field shall be repaired by recoating by the hot-dip process or by the metallizing process, except that in instances of minor damage to areas in the upper two-thirds of the perimeter as installed, the engineer may permit repair in the same manner as specified for repair during fabrication. The fabricated unit shall be thoroughly cleaned prior to recoating. The hot-dip process shall be in accordance with Sec 1020.3.

1020.7 Marking. Each section of pipe to be used on MoDOT projects shall be marked with an approved manufacturer's identification marking prior to shipment. The marking shall be permanent and located within 12 inches (300 mm) of the downstream end of the pipe.

1020.8 Handling. All pipe shall be handled with care to avoid damage. Pipe having damaged coating, localized bends in excess of 5 percent of the specified pipe diameter or any dent in excess of 1/2 inch (13 mm) will be rejected at the site of the work regardless of previous approvals. Rejected damaged pipe may be used if repaired to the satisfaction of the engineer.

1020.9 MoDOT Identification Number. When the manufacturer contacts the engineer in accordance with Sec 1020.5.3, the engineer will assign a specific MoDOT identification number for each size of pipe in the shipment.

1020.10 Bill of Lading. A bill of lading or delivery receipt for each shipment of pipe shall be furnished to the engineer at the shipping and destination points. The bill of lading shall contain an itemized statement of the sizes and lengths of pipe with the corresponding designated MoDOT identification number provided to the manufacturer for each size of pipe for that shipment. The bill of lading shall contain a certified statement. The certified statement shall be signed by an authorized representative of the manufacturer and shall state the following:

“This certifies that the pipe, bands and end sections in this shipment are in accordance with MoDOT specifications, were fabricated at an approved plant and were fabricated from the following brand names:”



SECTION 1022

CORRUGATED METALLIC-COATED STEEL PIPE UNDERDRAIN

1022.1 Scope. This specification covers corrugated metallic-coated steel pipe underdrain.

1022.2 Basis of Acceptance. Basis of acceptance will be in accordance with Secs 1020.2, and 1020.5, as specified herein.

1022.3 Material. Corrugated metallic-coated steel underdrain shall be in accordance with Sec 1020 and AASHTO M 36, Type III pipe for zinc-coated or aluminum-coated, with the following modifications.

1022.3.1 Pipe 6 inches (150 mm) in diameter shall be fabricated of steel no less than 0.052 inch, 18 gage, (1.32 mm) specified thickness. Pipe with diameters 8 to 21 inches (200 to 525 mm), inclusive, shall be fabricated of steel no less than 0.064 inch, 16 gage (1.63 mm), of the specified thickness.

1022.3.2 Coupling bands shall be of the same base metal as the pipe.

1022.3.3 Mechanical requirements of the base metal shall not apply.

1022.3.4 Samples for determination of coating thickness may be taken from fabricated pipe.

1022.4 Perforations. Unless otherwise specified, all pipe shall be perforated in accordance with the requirements for Class 1 perforations AASHTO M 36.